

## REMARKS

Claims 1-5 are pending herein.

I. The logical motivation or suggestion for the combination and *to totally design Tsurumi* was not established to reject claim 1 as required.

The USPTO respectfully rejects claim 1 under 35 U.S.C. § 103(a) as being obvious over Tsurumi et al. (US 6,070,867) in view of Kobayashi et al. (US 5,901,950).

Regarding the limitations of claim 1 that claim in relevant part:

“a follower gear including **an intermittent gear having a toothless portion;**  
and

...

wherein . . . **the follower gear is a helical gear.**” (emphasis added)

Present Figure 1 illustrates one embodiment of the claimed structure quoted above (see also pages 6-8 of the present specification). As seen in Figure 1, driving gear 1 engages the intermittent gear component 2A of follower gear 2. Intermittent gear component 2A has a toothless portion 2C. As described on page 8 of the specification, intermittent gear component 2A is a helical gear. Thus, follower gear 2 is a follower gear including an intermittent gear having a toothless portion, wherein the follower gear is a helical gear, as claimed in claim 1.

The claimed structure quoted above is important because it's claimed structure inherently and necessarily helps to ease the shock sounds and prevent the breakage of teeth when an intermittent gear transitions from a state of no meshing to a state of meshing (see pages 8-9 of the present specification). Thus, the intermittent helical gear claimed in claim 1 reduces the stress on a gear tooth by decomposing the force on the tooth into components perpendicular and parallel to the tooth trace. Therefore, the force against the tooth is effectively eased.

In contrast, in an intermittent spur gear (which appears to be what Tsunami teaches) the whole tooth trace of one tooth is simultaneously brought into mesh, possibly resulting in

shock sounds and stress and breakage of the teeth. *In fact, at page 8 the present specification the disadvantages of using a intermittent spur gear are explicitly discussed, i.e., the shock is too great in a traditional intermittent spur gear.*

Of note, as the USPTO respectfully notes on page 2 of the Office Action, Tsurumi fails to teach or suggest that the follower gear is a helical gear at all. Instead, Tsurumi teaches and favors use of an intermittent spur gear instead.

However, the USPTO cites Kobayashi and argues that it teaches the missing helical limitations, *and argues that it would obvious to totally redesign Tsurumi to use helical gears*, i.e., “to design the drive and follower gears of Tsurumi et al. as helical gears as taught by Kobayashi et al. in order to prevent a backlash between the gears when they engage and re-engage after the intermittent portion.”

In response, applicants respectfully assert that Kobayashi does not make up for the deficiencies in Tsurumi and is not readily combinable with Tsurumi because they are so different.

Thus, the USPTO’s reasoning is an improper because as discussed in MPEP § 2143.01, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, *to modify* or combine reference teachings and this is not present.

Instead, in reality, what may have occurred is that because the present specification discusses the disadvantages of using a spur gear at page 8, and advocates using a helical gear instead, that the USPTO read the specification and used an improper “hindsight analysis” *to argue that totally redesigning Tsurumi to use a helical gear would be obvious*. This is improper as discussed in MPEP 2145 X:

#### A. Impermissible Hindsight

Applicants may argue that the examiner's conclusion of obviousness is based on improper hindsight reasoning. However, “[a]ny judgement on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made **and does not include**

***knowledge gleaned only from applicant's disclosure***, such a reconstruction is proper." *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971). (emphasis added)

Thus, applicants argue that it would be not be logical, obvious or straightforward to combine and modify these references to obtain claim 1 as this total redesign of Tsurumi is not logically suggested by anything in the references and instead respectfully appears to have been an improper hindsight analysis. See discussion below.

There is no logical suggestion or motivation to combine the cited references because the purpose of using helical gears in Kobayashi is not on point.

In Tsunami et al, the notched gear (6) having the non-toothed portion is presumably a spur gear.

In Kobayashi et al, there is disclosed that the gear (20) and the gear (25) engaged with the gear (20) each having gear over the entire circumferential surface are helical gears.

However, neither Tsunami et al nor Kobayashi et al discloses, teaches or suggest that a notched gear having a non-toothed portion should be a helical gear. Instead, the USPTO simply states without support that is would be obvious totally redesign Tsurumi to use helical gears to prevent backlash. However, the structure of claim 1 is directed to preventing breakage of teeth, reducing sounds, and increasing torque and is not directed to backlash. These are different problems.

For example, Tsunami discloses in col. 2, in lines 21-51, that "In such a drive controlling apparatus using the notched gear, a force for rotating gear until the toothed portion is engaged by the drive gear (referred to as "rotation starting force") is required. However, due to such strong rotation starting force, the following problems arise. The entire apparatus becomes complicated. The rotational speed of the drive gear is increased by an amount corresponding to backlash between a gear of the motor M and drive gear". Thus, Tsunami teaches using an adequate rotation starting force by a mechanism to solve the conventional backlash problems.

On the other hand, Kobayashi et al discloses in col. 1, lines 31-40, that “the document feeding speed increases momentarily, just before a rear end of a sheet of the document leaves the upper and lower transfer rollers, and then decreases momentarily immediately after the rear end of the sheet has left the upper and lower transfer rollers. The document feeding speed is not kept precisely constant in the conventional facsimile machine as described above. Fluctuation of the document feeding speed causes a deterioration of image reading accuracy”. That is, helical gears are used in order to solve the abovementioned **speed problem**.

Accordingly, there is no motivation for Tsunami et al to use the helical gear taught in Kobayashi et al in a notched gear having a non-toothed portion, because the objects or purposes of the references are not relevant to claim 1. For example, backlash + speed does not equal the teachings of the present invention which is inherently to **prevent a breakage of a tooth concerned and generation of shock sounds** by constituting an intermittent gear having a toothless portion with a helical gear of claim 1.

Specifically, as discussed in the specification at page 8, in line 19 through page 9, line 6, “force acting from the teeth of the drive gear 1 to the teeth of the first follower gear 2 is not directed perpendicularly to the tooth trace. That is, the force acting on the teeth of the intermittent gear component 2A of the first follower gear 2 is decomposed into a component perpendicular to the tooth trace and a component parallel to the tooth trace. Therefore, breaking force against teeth is effectively weakened, and even in a case where the driving torque is large, the breakage of teeth is prevented”.

Therefore, neither Tsunami et al nor Kobayashi et al produces or contemplates the inherent structural effects of claim 1, as explained above.

Thus, as the Examiner is respectfully aware, MPEP 706.02(j) sets out the requirements for an obviousness rejection:

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in

the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).” (emphasis added)

Applicants respectfully assert that a *prima facie* case of obviousness has not been established at least because there is not motivation to combine the cited references. The USPTO bears the burden of showing a motivation to combine the Tsurumi and Kobayashi references (MPEP 2142).

Specifically, as noted on pages 1-2 and 8-9 of the present specification, **the structure claimed in claim 1 reduces the force on the teeth of the gears and prevents tooth stress and breakage.** When a spur gear (see Tsurumi) is used as an intermittent gear having a toothless portion, the transition between a non-mesh state (the toothless portion) and a mesh state (drive gear engaged with toothed portion) generates excessive force on the teeth and breakage can occur.

The structure of claim 1 which uses a helical gear as an intermittent gear having a toothless portion solves this problem by easing the stress on the tooth of the gear (see pages 8-9 of the specification). Thus, **the structure claimed in claim 1 prevents breakage of the teeth on an intermittent follower gear when transitioning from a non-mesh state to a mesh state.**

In contrast, applicants respectfully assert that the different reason **for using helical gears in Kobayashi was to generate a force on the gear in an axial direction** (see Kobayashi column 5, lines 18-45). As seen in Kobayashi Figure 7, an axial force on helical driving gear 20 generates contact with friction pad 47, preventing backlash and allowing for a constant speed of document feeding. The fact that follower gear 25 is helical appears to only be a consequence of having a helical gear 20. **Kobayashi does not appear to indicate, teach, or suggest either inherently or explicitly an independent reason for having a helical follower gear.** Again, **the reason for using helical gears in Kobayashi is to take advantage of the axial force on the gear to press against a friction pad and reduce backlash, in order to maintain a constant document feeding speed.** **Therefore, a person having ordinary skill in the art would not have logical motivation to look to Kobayashi totally redesign Tsurumi to solve the problem of preventing gear tooth breakage or**

**sounds when transitioning between a non-mesh state and a mesh state because preventing tooth breakage is a different problem than preventing backlash in order to maintain a constant document feeding speed.**

Thus, applicants respectfully note that the USPTO has used an impermissible “hindsight analysis” to “fill in the gaps” in its reasoning regarding motivation and suggestion and what Kobayashi actually teaches and suggests **and to totally redesign Tsurumi**. If the Examiner wishes to rely on her own knowledge of the art “to fill in the gaps,” she should respectfully take “Official Notice” or present an affidavit of the Examiner (MPEP 2144.03).

Thus, applicants respectfully assert that no motivation or suggestion to combine the cited references has been demonstrated as required. Therefore, it is respectfully asserted that a *prima facie* case of obvious has not been established as required, and the rejection to claim 1 has been respectfully overcome.

## **II. The obviousness rejection of claim 5.**

Similar to claim 1, claim 5 claims a follower gear including an intermittent gear having a toothless portion, wherein the follower gear is a helical gear. As noted above, Tsurumi and Kobayashi do not teach or suggest this claimed structure, nor is there a motivation to combine Tsurumi and Kobayashi. Therefore, it is respectfully asserted that claim 5 is allowable.

## **III. The dependent claims.**

It is respectfully asserted that independent claim 1 is allowable. Therefore, it is further respectfully asserted that dependent claims 2-4 are also allowable.

IV. Conclusion.

Reconsideration and allowance of all of the claims is respectfully requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Please contact the undersigned for any reason. Applicants seek to cooperate with the Examiner including via telephone if convenient for the Examiner.

Respectfully submitted,

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\* above is an S SIGNATURE  
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